



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000

711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

May 17, 2013

Ms. Kate Kelly, Director
Office of Air, Waste, and Toxics
U.S. EPA Region 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

Dear Ms. Kelly:

Your letter of December 20, 2012, requested information from Ecology and Simpson Tacoma Kraft (STK) in support of Ecology's draft PSD permit revision for the company (PSD-06-02). The information was requested in order to help EPA ensure that Ecology's draft permit is consistent with federal law. Ecology has worked closely with STK over the past several months to compile the information. Ecology's approach to responding to your information request is outlined briefly in this letter; the detailed responses are included in Appendix A, B, C, and D.

Your December 2012 letter requested the following:

1. A detailed accounting of the sources, specific and relative quantities, types, and characteristics (e.g., chloride content) of all the fuels and materials burned in Boiler #7 during the 2004-2005 time period which formed the basis for the PSD permit limits, and since the PSD permit was issued in 2007. This accounting must include more than a general description of the fuels and materials that have been or may be used as feedstock, and should delineate the suppliers, composition, quantities and combination of the different materials and fuels that have been or are being burned. All descriptions need to be referenced to the original source documentation and copies of the referenced documentation provided.
2. A detailed description of any physical changes to Power Boiler #7 since the 2007 PSD permit was issued. Any description need to be referenced to the original source documentation and copies of the referenced documentation provided (e.g. construction plans and specifications).

Ecology's Response to Item 1:

- The information used by Ecology to evaluate visible plume issues and draft the proposed PSD amendment is included in Appendix A. This includes fuel chloride content and boiler chloride emission rates for STK, other national hog fuel boilers, and several hog fuel boilers that had visible plume issues. Information on ammonia slip levels and visible plume problems is also given. Ecology's preparation of the PSD amendment began with receipt of the initial application on March 24, 2010, and a revised application on August 20, 2010.
- In response to EPA's December 2012 information request to Ecology, STK submitted additional materials which are included in Appendix B. These materials provide a more detailed accounting

of the sources, specific and relative quantities, types, and characteristics (e.g., chloride content) of all the fuels and materials burned in Boiler No. 7 during 2004–2005 and since then. A description of the fuels and materials that have been used as feedstock is included. The suppliers, composition, quantities and combination of the different materials and fuels combusted are given. A CD containing STK's complete response, including additional records to those printed in Appendix B, is included in the attachments to this letter.

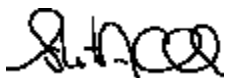
Ecology's Response to Item 2:

- Section 5 of STK's August 2010 PSD amendment application provides a time sequenced list of Boiler No. 7 construction activities from the 2007 PSD permit's effective date to the time the amendment application was prepared. This was both to document STK's efforts to decrease and maintain NO_x emissions and to show that there had not been an 18-month gap in construction activities. These activities can be checked against the list of construction activities permitted under the original permit application (2006 original permit application Section 2, "Project Description") which is described in the original permit's Technical Support Document (Section 2.2.2 of the TSD, pages 3-4). For ease of comparison, Appendix C contains this list of permitted construction activities followed by the list of actual post permit construction activities.
- In response to EPA's December 2012 information request to Ecology, STK submitted additional materials that provide a more detailed description of physical changes to Power Boiler No. 7 since the 2007 PSD permit was issued. A summary table of work orders issued from 2007 to 2012 is included in Appendix D to this letter in printed form, and as pdf and Excel files with "Response 2" file names on the attached CD.

After evaluating the original materials submitted by STK in support of the PSD amendment, as well as the additional information STK has provided in response to EPA's information request, Ecology continues to believe that the draft PSD permit shared with EPA on March 21, 2011, meets all PSD requirements and is consistent with federal law.

Ecology welcomes further discussions with EPA on this permitting action and we are eager to resolve our differences and come to a resolution on the appropriate way to permit the STK facility. Please contact Bob Burmark at (360) 407-6812 or robert.burmark@ecy.wa.gov if you have any further questions.

Sincerely,



Stuart A. Clark
Air Quality Program Manager

Enclosures

cc: Bob Burmark, Ecology
Robert Carruthers, Ecology
Don Dossett, EPA, Region 10
Jeff Johnston, Ecology
Lester Keel, Simpson Tacoma Kraft Co., LLC
Jay Russell, SLR International Corp.

APPENDIX A

In response to Item 1 of EPA's December 20, 2012 letter, Appendix A contains information on sources and chloride content of fuels that Ecology used when preparing the Simpson Tacoma Kraft PSD-06-02 Amendment 1 draft PSD permit. This information is supplemented by Appendix B. Electronic copies of these materials are included on the attached CD.

The information used by Ecology to process Simpson Tacoma Kraft's (STK's) request to amend PSD-06-02 included the application dated August 2010, later information submittals made in response to comments, material from Ecology's Industrial Section files, reference materials from other sources such as NCASI, and pictures of the site such as available through Google. In the permit application, Section 6.4.1 "Environmental Impacts" presented STK's discussion of their concern that a control system using ammonia injection would cause a visible plume. This discussion compared the range of chloride content in fuels and boiler chloride emission rates from the NCASI survey of 30 national hog fuel boilers to that of Simpson and several other hog fuel boilers that had visible plume issues. It also discussed ammonia slip and the levels of slip that would or would not form a visible plume.

The following is information on the above topics used while permitting the original PSD permit and the amendment application:

1. The STK permit amendment application "PSD Amendment for Power Boiler No. 7 NO_x Limits," August 2010. Pages 1-23 are copied for this data submission, but no appendices are included. If desired, EPA has the complete application in pdf format.
2. STK response to Ecology comments dated December 20, 2010.
3. Mercury, Hydrogen Chloride, and Chlorine Emissions test Report for emissions from the #7 Power Boiler done by the Aspen Consulting & Testing company for STK on April 6 through 8, 2005.
4. STK letter to Ecology's Industrial Section dated March 27, 2006, regarding testing and analysis for the Boiler No. 7's MACT Health-Based Compliance Alternative for HCL Eligibility Demonstration.
5. STK letter to Ecology's Industrial Section dated June 22, 2006, regarding STK's response to Comments – Boiler MACT Compliance Alternative Demonstration.
6. NCASI Technical Bulletin 875, April 2004, "Nationwide Evaluation of Mercury and Chlorine Levels in Bark and Stemwood." This publication investigates the range of mercury and chloride emissions from bark and stemwood fuels of 30 hog fuel boilers across the nation.
7. 2006 Google picture of STK site and surroundings showing a barge of chips being unloaded to STK and floated logs probably going to a nearby sawmill.
8. Two salt fuel related queries from Ecology's historical 1997 Wood Fired Boiler database. The first query listed whether or not the boiler burned salty fuel (yes or no). The second query ranked the "saltiness" of the fuels from boilers that might or did burn salty fuels (from unknown to percent of fuel mix that was considered salty). Ecology made this database in the mid-'90s in support of the state Boiler RACT and other hog fueled boiler related efforts.

APPENDIX B

Appendix B contains additional information provided by Simpson Tacoma Kraft Company to Ecology on May 13, 2013, in response to Item 1 in EPA's December 20, 2012 letter.¹ Electronic copies of these materials are included on the attached CD.

This information contains a figure illustrating the biomass supply to Power Boiler #7. Also contained are 11 tables with general descriptions, sources, specific and relative quantities, and types and characteristics of fuels burned in Power Boiler #7:

Figure 1 illustrates that the biomass component of the fuel is comprised of purchased hog fuels, Recycle Paper Fiber Residuals (OCC rejects), dewatered biosolids (sludge), and fines.

Table 1 lists each fuel type and has a description of the fuel and its source.

Table 2 summarizes fuel usage for Power Boiler #7. The type, quantity, average heating value, and relative quantity of each fuel is listed from 2004 to 2005 and from 2007 to 2012.

Table 3 lists the amount of biomass (hog fuel) purchased from each supplier (supplier names are confidential) from 2004 to 2012.

Table 4 describes RFO suppliers and characteristics. Information in this table includes the date, the supplier, the heating value and specific gravity of the fuel, and the sulfur, ash, and lead content of the fuel.

Table 5 summarizes the purchased biomass (hog fuel) characteristics. The sample dates, sources, heating values, and solids, ash sulfur, mercury and chloride contents of the fuel are listed in the table. This information is listed from 2005 to 2007 and from 2010 to 2012.

Table 6 lists the characteristics of the dewatered biosolids used from 2005 to 2007. The sample dates, sources, heating values, and solids, ash sulfur, mercury and chloride contents of the fuel are described in the table.

Table 7 summarizes the Recycle Fiber (OCC) Residual characteristics used in 2005. The sample dates, sources, heating values, and solids, ash sulfur, mercury and chloride contents of the fuel are listed in the table.

¹ "A detailed accounting of the sources, specific and relative quantities, types and characteristics (e.g. chloride content) of all fuels and materials burned in Power Boiler #7 during the 2004–2005 time period which formed the basis for the PSD permit limits, and since the PSD permit was issued in 2007. This accounting must include more than a general description of the fuels and materials that have been or may be used as feedstock, and should delineate the suppliers, composition, quantities and combination of the different materials and fuels that have been or are being burned. All descriptions need to be referenced to the original source documentation and copies of the referenced documentation provided."

Table 8 describes the purchased biomass (hog fuel) characteristics. The sample dates, sources, heating values, and solids, ash sulfur, mercury and chloride contents of the fuel are listed in the table. There is data from 2005 to 2007 and from 2011 to 2012 in the table.

Table 9 lists the characteristics of the wood fines used in 2005. The sample dates, sources, heating value, and solids, ash, sulfur, mercury and chloride contents of the fuel are summarized in the table.

Table 10 describes the characteristics of the Recycled Fuel Oil used in 2005 and 2006. The sample dates, sources, heating values, and sulfur, mercury and chloride content of the fuel are listed.

Table 11 summarizes the heating value of the natural gas from Puget Sound Energy from 2002 to 2012.

Copies of the available laboratory analysis reports for the fuels are provided on the enclosed CD.

APPENDIX C

In response to Item 2 in EPA's December 20, 2012 letter, Appendix C contains information available to Ecology at the time of permitting regarding physical changes permitted by PSD-06-02 and what had been constructed as of the time that the application for PSD-06-02 Amendment 1 was prepared. This information is supplemented by Appendix D.

The following italicized text quotes two previously submitted permit items related to what was allowed by the original permit, and what was constructed. The first is Section 2.1 Physical Description (pages 2-3) of Simpson Tacoma Kraft's original September 2006 application for PSD-06-02. This section described the project STK requested to be permitted. The second is a list of construction tasks done since the original permit was issued.

2.0 PROJECT DESCRIPTION

2.1 PHYSICAL DESCRIPTION

The Project will modify #7 Power Boiler and #4 Recovery Boiler and install equipment to allow Simpson to generate electricity either for internal use or for distribution on the utility power grid.² Two generation options are under consideration: 1) a "backpressure" steam turbine, or 2) a condensing steam turbine.

- 1) The "backpressure" steam turbine would be sized to accept the mill's full existing steam load from #4 Recovery Boiler and #7 Power Boiler. Steam would be extracted at 425 pounds, 180 pounds, and 65 pounds for process use. In essence, the backpressure steam turbine would replace existing pressure reducing valves that reduce steam pressure. There would be no condenser or cooling tower. The #7 Power Boiler and #4 Recovery Boiler would be modified to produce higher pressure and temperature steam. Compared with existing operations, supporting the backpressure steam turbine would require approximately five percent more heat input (MMBtu/hr) from #7 Power Boiler.*

The backpressure steam turbine generator would generate approximately 28 Megawatts (MW) on an annual average basis. This electrical output would be used internally or sold to the utility grid, and would partially offset the power needed to operate the pulp and paper mill.

- 2) The condensing steam turbine would be sized to generate up to 55 MW on a short term basis. Approximately 43 MW of power will be generated under normal operation. About*

² #6 Power Boiler will not be connected to the steam line serving the steam turbine generator.

28 MW of this will be cogenerated from steam that is extracted from the turbine at pressures needed for use in mill processes and the remaining 15 MW will be generated from steam that is condensed once it leaves the turbine. The equipment will be sized to generate 55 MW to make full use of available steam when some process steam users are not operating. This will allow the boilers to operate steadily rather than swinging to follow operation of the process units.

The condensing steam turbine option would require that No. 7 Power Boiler double its steam production compared with current average operating rates (from about 170,000 pounds per hour to 340,000 pounds per hour).

In both cases, the steam turbine would be located in approximately the same location (see Figure 2-1). Also in both cases, Simpson will decide whether to use all electricity it generates internally or to sell it on the open market while purchasing the power required for mill operations from the local electric utility.

The steam turbine generator does not emit air pollutants, but it will require #7 Power Boiler to fire more fuel to produce the steam for generation. Because the heat input requirement for the condensing steam turbine is significantly higher than for the backpressure steam turbine option, boiler emissions associated with the condensing steam turbine option are significantly higher than for the backpressure option. The condensing steam turbine is the preferred option at the time of this writing and this permit application focuses on the condensing steam turbine emissions and environmental consequences. If Simpson chooses to proceed with the backpressure option, Simpson will submit a separate Notice of Construction for a minor modification to #7 Power Boiler.

The main features of the condensing steam turbine generator project (hereafter, the Project) will include the purchase and installation of:

- A steam turbine and electrical generator rated at up to 55 MW.*
- Power distribution and overload protection equipment.*
- A building to house the turbine/generator.*
- Upgrades to the demineralizer system to produce the higher-quality boiler feedwater required for power generation.*
- A cooling tower to condense the turbine discharge steam that is not used in the process.*
- Boiler improvements to produce the higher pressure and temperature steam required for power generation. These improvements will include adding tube area to #7 Power*

Boiler's superheater section, upgrading the pressure rating of #4 Recovery Boiler's generation bank, new pressure safety valves, and piping changes to handle higher pressure steam.

- *Upgrades to #7 Power Boiler to increase its Maximum Continuous Rated (MCR) steaming capacity from 300,000 pounds/hour (lb/hr) to 340,000 lb/hr. These will include larger forced-draft and induced-draft fan motors, wood fuel feed system improvements, and possibly improvements to the ash handling, electrostatic precipitator and other ancillary systems. An engineering study concluded that 340,000 lbs/hour is the maximum steam production that #7 Power Boiler can sustain without significant upgrades to other boiler components.*

Figures 2-2, 2-3, and 2-4 present a plan view and cross sections of the generator building and cooling tower proposed as part of the Project.

See the original application for Figures 2-1, 2-2, 2-3, and 2-4 in electronic format. These four figures are printed and attached to Appendix C here for convenience.

The following italicized text is taken from Simpson's March 2010 application to amend PSD-06-02, pages 4-7, and repeated as Chapter 5 in the August 2010 revised application. This list was put in the application to show that a continuous construction effort had occurred, but it also creates a list of tasks constructed. The new information submitted by STK in Appendix D provides many more details behind this list.

The following list summarizes Simpson's efforts to decrease and maintain NO_x emissions.

2006

- ***April 21** – Notice of Construction (NOC) issued for OFA Project*
- ***September 5** – Submitted Cogen Project PSD/NOC application*
- ***September** – Installed new OFA System*

2007

- ***May 23** – PSD Permit issued for Cogen Project. Begin detailed design and construction for Cogen Project. Proposed design changes included increasing the maximum continuous steaming capacity of Power Boiler No. 7 to 340,000 lb/hr using biomass fuel alone compared to its original design of 300,000 lb/hr from mixed biomass and fossil fuel.*
- ***July** – Ordered new superheater and cold side economizer for the Cogen Project.*

2008

- ***May** – Contracted QBM Engineering to upgrade boiler instrumentation and control.*
- ***June** – Corrected over fire air flow and under grate air flow absolute air flow calculations.*

- **July through August** – Replaced obsolete operator control screens with new HMI package. Engineered hardware, software and HMI screens for Burner Management System and air flow controls.
- **September** – Boiler down to install superheater, cold side economizer, interstage attemperator, and sweetwater condenser. Installed new biomass fuel feed chutes with offset back blast damper (chute plugging). Modified OFA system air heater. Unable to increase boiler production capacity due to discovery of tube thinning in generator bank.
- **October through December** – Commissioned variable speed Induced Draft Fan and Forced Draft Fan. Implemented redundant operator interface network. Continued to engineer hardware, software and HMI screens for Burner Management System and air flow controls.

2009

- **January through February** – Installed copper backbone and devices for Burner Management System and air flow controls. Started implementation of Fuel Flame Safety controls.
- **March** – Power Boiler No. 7 down to replace generator bank to increase steam capacity.
- **April** – Cogen boiler capacity upgrade work completed. Burner Management System controls completed. Implemented upgraded auxiliary fuel air curves for oil and gas. Automated OFA flow based on air master set point. Automated under grate air flow based on air master set point. Completed implementation of Fuel Flame Safety controls. Started implementation of Advanced Combustion Air Controls.
- **May** – Optimized and tuned new Burner Management System and air controls.
- **June** – Provided a real time boiler efficiency screen for Operators. Installed additional pressure transmitter to increase accuracy of OFA calculation. Began testing of the steam turbine. Power Boiler No. 7 at reduced rate due to capacity and plugging of biomass fuel delivery systems.
- **July** – The steam turbine is certified for commercial operation by the power customer and it began to export electrical power on a regular and scheduled basis. Implemented electronic cam on distributor air dampers to reduce tramp air. Implemented closed door interlock on biomass fuel delivery chutes to reduce tramp air. Increased hydraulic capacity on biomass fuel reclaimers. Installed automated moisture meter for biomass feeding the boiler. Installed variable speed drives on biomass feed systems. Modified biomass feed equipment to improve feed uniformity. Implemented advanced operator interface display for environmental parameters.
- **August** – Provided online boiler emission statistics on HMI screens – 1 hr, 12 hr, 24 hr, 7 day, and monthly CO and NO_x values. Provided online boiler air consumption summary table on HMI screens.
- **September** – Submitted test plan and notification of testing to Ecology for the initial compliance test as required by the PSD Permit. Confirmed OFA fan capacity is adequate because flow is being reduced by air heater leaks. Purchased new electronic scale package for biomass fuel supply and return belts.

- **October** – Repaired portion of failed Air Heater Tubes attributed to CO increases. Installed first variable speed mixing screw in the biomass bin (provides more even fuel distribution on the grate). Relocated 24” structural beam above feed screws to reduce tramp air by keeping the clean-out doors closed.
- **November** – Optimized under grate air damper automatic pressure control system. Detroit Stoker factory representative on site to evaluate Distributor Air Fan and Biomass Fuel Distribution Dampers.

2010

- **January** – Installed additional variable speed mixing screws in the biomass and improved reliability of the biomass reclaim system, improving distribution and uniformity of fuel to the grate, and consistency of the fuel delivery to the boiler. Developed and implemented advanced fuel algorithms for improved combustion control.
- **February** – Installed additional furnace oxygen measurement meters, to increase accuracy of furnace combustion measurements, improving combustion controls and further controlling emissions. Installed and began using new and more accurate biomass fuel measurements to fine tune boiler fuel combustion controls.
- **May** – Repair the air heater tubes. Install final (fourth) variable speed mixing screw in biomass fuel bins to improve feed uniformity and control.
- **June** – Installed the backpressure control valve at the outlet of the 425 pound steam extraction stage of the steam turbine. Without the backpressure valve, the turbine does not operate as it was designed.

Capital Expenditures and Contracts Issued

- 9/2007 – ACE Replace Power Boiler No. 7 NO_x/O₂ and CO emission analyzers
- 10/2007 – ACE Rockwell to PHD Tag Conversion
- 11/2007 – ACE Power Boiler No. 7 HMI Replacement
- 11/2007 – ACE Redundant Operator Interface Network
- 5/2008 – Contract QBM Engineering Process Engineer (PO0802952)
- 12/2008 – ACE Power Boiler No. 7 Burner Management Upgrade
- 2/2009 – ACE Power Boiler No. 7 Biomass Fuel Bin Modifications
- 4/2009 – ACE Power Boiler No. 7 Biomass Fuel Bin Modifications
- 8/2009 – ACE Power Boiler No. 7 Biomass Fuel Feed
- 8/2009 – ACE Power Boiler No. 7 Optimization O₂, CO and NO_x Control
- 9/2009 – Contract MoistTech to provide real time biomass fuel moisture meter (PO0905137)
- 9/2009 – Contract Jansen Engineering to test OFA fan (PO0905296)
- 9/2009 – Contract ABB to develop automated air and emissions controls (PO0905117)

- 10/2009 – Contract Weigtech to provide upgrade biomass fuel scales (PO0905487)
- 10/2009 – ACE Power Boiler No. 7 Biomass Fuel Feed Supplemental
- 10/2009 – Contract Detroit Stoker to test Distributor Air fan (PO0905877)
- 10/2009 – Contract ABB to develop automated under grate air damper control (PO0905558)

As summarized above, Simpson has been implementing actions to minimize NO_x emission and keep NO_x below the PSD BACT limits. However, it is clear that the boiler will not be able to demonstrate continuous compliance with the new 0.20 lb/MMBtu NO_x limit while maintaining CO emission below 0.35 lb/MMBtu.

APPENDIX D

Appendix D contains additional information provided by Simpson Tacoma Kraft Company to Ecology on May 13, 2013, in response to Item 2 in EPA's December 20, 2012 letter.

Table 1 lists relevant work orders and general descriptions of each project for work performed on Power Boiler #7 from 2007 to 2012. The Excel file of this table is included on the enclosed CD labeled "Response2 – Table1 5-18-13.xlsx."

Copies of the actual work orders listed in Table 1 are not printed, but are provided on the enclosed CD in the file labeled "Response-2 STKWork Orders." These copies contain details of the work performed on Power Boiler #7.